INDEX

Page

Abortion, infectious, immunizing cattle against, tests with *Brucella abortus* strain 19 ... 117–127
Acidity, titratable, in sorgo stalk, distribution and variation with maturity. Emil K. Ventré and S. Byall ... 553–562
ACREE, RUBY J., and GOSS, WARREN H.: A Microchemical Colorimetric pH Procedure for Differentiating the Telia of *Cronartium ribicola* and *C. occidentale* ... 347–352
ADDINGTON, L. H., CUNNINGHAM, O. C., and ELLIOT, LEWIS T.: Nutritive Value for Dairy Cows of Alfalfa Hay Injured by Sulphur Dioxide ... 381–391
Agamermis decaudata, parasitism on grasshopper, comparison with *Mermis subnigrescens* ... 353, 355–356, 362, 363
Agropyron—
  repens, host of *Rhynchosporium secalis*, investigations ... 176, 180, 189–190, 192, 193, 194–195
  smithii, absorption of selenium ... 67–68
Alfalfa—
  dwarfed and healthy, transpiration rate, study ... 97–99
  hay. *See* Hay, alfalfa.
  meal, carotene loss during storage. Edward A. Kane, Herbert G. Wiseman, and C. A. Cary ... 837–847
  meals—
    green color and carotene content, experiments ... 843–845
    storage experiments ... 843–845
  nutritive value, effects of sulphur dioxide, experiments ... 381–391
  plant, dwarf disease on, effect. J. L. Weimer ... 87–104
  plants—
    dwarfed and healthy—
      ash content, comparison ... 102–103
      hydrogen-ion concentration and acidity, comparison ... 100–102
      sugar and starch content, comparison ... 103
      transpiration ... 97–99
    dwarfed, water content, percentage ... 96–97
    gum in, character, investigations ... 91–95
    gum in, origin, determinations ... 95–96
    water content, effect of dwarf disease on ... 96–97
  roots—
    dwarf disease, description ... 87–90
    dwarfed, water flow, rate ... 99–100
  stems, dwarf disease, description ... 90–91
Alfileria, passage of attenuated curly top virus through for tests of virulence ... 456–457, 460
ALLEN, MERLE W., and PAINTER, REGINALD H.: Observations on the Biology of the Wheat-Stem Maggot in Kansas ... 215–238
Ammonium, utilization by *Aspergillus niger*, role of molybdenum. Robert A. Steinberg ... 891–902
ANDERSON, ARTHUR K., and PRITHAM, GORDON H.: The Carbon Metabolism of *Fusarium lycopersici* on Glucose ... 937–949
Aplopappus fremonti, absorption of selenium ... 61, 66, 67
Apple—
  blotch, suppression by spraying, experiments ... 424–426
  leaves, on ground, chemical treatment for *Venturia inaequalis* infection ... 422–423
  scab—
    combating with eradicant fungicides, potentialities. G. W. Keitt and D. H. Palmiter ... 397–437
    epidemiology of, effects of eradicant spraying on, experiments ... 415–422
    eradication, spraying experiments ... 397–423
    work, present status ... 423
  See also *Venturia inaequalis*.

Page

Apples—
  color, effect on soggy break-down ... 756
  delayed storage, relation to soggy breakdown ... 747–752, 760
  Extra Fancy Northwestern Greening, soggy break-down at different storage temperatures, experiments ... 742–744
  fertilizers, effect on soggy break-down ... 756–757
  Golden Delicious, soggy break-down at different storage temperatures, experiments ... 746
  Jonathan, soggy break-down, at different storage temperatures, experiments ... 740–742, 759–760
  maturity on date of picking, relation to susceptibility to soggy break-down ... 752–754
  soggy break-down—
    development, factors influencing. H. H. Plagge and T. J. Maney ... 739–763
    period of development ... 757–759
  storage—
    in open containers, effect on soggy breakdown ... 754–756, 761
    room atmosphere, effect on soggy breakdown ... 754–756, 760
  Wealthy, soggy break-down at different storage temperatures, experiments ... 744
  Winter Banana, soggy break-down at different storage temperatures, experiments ... 745–746
Aristida sp. from salt sick and healthy areas—
  content of trace elements, estimation ... 731–732, 734–736
  copper content, quantitative determination ... 732–734
Armyworm, southern—
  cardiac response to nicotine, investigations ... 1–16
  susceptibility to nicotine, experiments ... 911–913
Arsenical compounds—
  source and purity, studies ... 440–441
  use in spraying for apple scab, experiments ... 402–435
Arsenites, toxicity to fungi, tests ... 400–435, 441–450
ARTSCHWAGER, ERNST: Observations on the Effect of Environmental Conditions on the Structure of the Lateral Roots in Sugar Beet ... 81–86
Ash content of alfalfa, dwarfed and healthy plants, comparison ... 102–103
Aspergillus niger, utilization of ammonium and nitrate nitrogen, role of molybdenum. Robert A. Steinberg ... 891–902
Astragalus spp., absorption of selenium ... 59–67
Avena spp., seedling stage, reaction to physiologic races of *Puccinia graminis avenae*, studies ... 718–724
Averages, set of, variance, formula for reducing computations necessary for finding. William Dowell Baten ... 575–580

Bacillus megatherum, food of *Dictyostelium discoideum* myxamoebae ... 304–305
Bacteria, saprophytic, association with *Dictyostelium discoideum* ... 293, 296–301
Bacterium angulatum—
  cause of blackfire disease of tobacco ... 883
  development in water-soaked tobacco leaves, inoculation experiments ... 883–886
  infection—
    of plant tissues by spray inoculations ... 602–603
    relation of water-soaked tissues to. James Johnson ... 599–618
Bacterium tabacum, infection—
  of plant tissues by spray inoculations ... 603–604
  relation of water-soaked tissues to. James Johnson ... 599–618
BAIN, HENRY F.: Production of Synthetic Mycorhiza in the Cultivated Cranberry ... 811–835

Page

Bang's disease, immunizing cattle against, tests with *Brucella abortus* strain 19 117-127
Bark beetles, infestation of Norway pine logs 129, 130, 139
Barley—
covered smut, economic importance and control measures 683
proteins in rations for pigs, biological value of casein as a supplement. E. H. Hughes 461-465
rhynchosporium scald of. Ralph M. Caldwell 175-198
winter varieties, differential hosts of races of *Ustilago hordei* 689-690
BATEN, WILLIAM DOWELL: A Formula for Reducing the Computations Necessary to Find the Variance of a Set of Averages 575-580
Bean—
beetle, Mexican, larvae, feeding bean leaves treated with derris, experiments 903-905, 907
leaves—
rotenone content, isolation and identification 906-907
treated with derris, toxicity to goldfish, experiments 905-906, 907
treated with derris, toxicity to Mexican bean beetle larvae, experiments 903-905, 907
plants, derris constituents, translocation. Robert A. Fulton and Horatio C. Mason 903-907
Beet leafhopper in central Columbia River breeding area. Orin A. Hills 21-31
Beetles, wood-boring, cause of deterioration of Norway pine 130-138, 140
Beta vulgaris. *See* Sugar beet; Sugar beets.
BLACK, W. H., SWETT, W. W., MILLER, FRED W., GRAVES, R. R., and CREECH, G. T.: Comparative Conformation, Anatomy, and Udder Characteristics of Cows of Certain Beef and Dairy Breeds 239-287
Blackfire disease of tobacco, development, relation to water soaking of leaves. E. E. Clayton 883-889
BLANK, L. M.: *Fusarium* Resistance in Wisconsin All Seasons Cabbage 497-510
Blister rust, white pine—
intensification by *Ribes lacustre* 878-880
susceptibility of *Ribes* spp. found within commercial range of *Pinus monticola* 318-344
See also *Cronartium ribicola*.
Blueberry. See *Vaccinium canadense*.
BLYTHE, R. H., JR.: A Simplified Method of Constructing Merchantable Board-Foot Volume Tables 159-173
Board-foot volume tables, merchantable, simplified method of constructing. R. H. Blythe, Jr 159-173
BOND, V. S., WILSON, P. W., and BURTON, J. C.: Effect of Species of Host Plant on Nitrogen Fixation in *Melilotus* 619-629
BONDE, REINER, and FOLSOM, DONALD: Some Properties of Potato Rugose Mosaic and Its Components 765-783
BOWMAN, D. H., MARTIN, J. H., MELCHERS, L. E., and PARKER, JOHN H.: Inheritance of Resistance to Pythium Root Rot in Sorghum 105-115
British Columbia, *Ribes* in, susceptibility of four species to white pine blister rust 317-345
Bromus inermis, host of *Rhynchosporium secalis*, investigations 177, 189-190, 192, 193, 194, 197
BROOKS, CHARLES, and MCCOLLOCH, LACY P.: Some Effects of Storage Conditions on Certain Diseases of Lemons 795-809
Brucella abortus—
strain U. C. V. 36, inoculation of cattle with 121-127
United States Bureau of Animal Industry strain 19—
inoculation of cattle with 120-121
inoculation of guinea pigs with 119-120
pathogenic and antigenic effects, observations. C. M. Haring and J. Traum 117-128
virulence, tests for 119-127
Bunt pathogenes, physiological races 483-495

Page

Buprestid beetles, presence in felled logs of Norway pine 130, 136, 139, 140
BURTON, J. C., WILSON, P. W., and BOND, V. S.: Effect of Species of Host Plant on Nitrogen Fixation in *Melilotus* 619-629
BYALL, S., and VENTRÉ, EMIL K.: Distribution and Variation With Maturity of Dissolved Solids, Sucrose, and Titratable Acidity in Sorgo Stalk 553-562
BYERS, HORACE G., and MILLER, JOHN T.: Selenium in Plants in Relation to Its Occurrence in Soils 59-68

Cabbage—
varieties, breeding for resistance to *Fusarium*, experiments 497-509
Wisconsin All Seasons—
Fusarium resistance. L. M. Blank 497-510
progenies from self- and cross-pollinated plants, susceptibility to *Fusarium*, studies 498-509
yellows, resistance in Wisconsin All Seasons variety 497-510
Calcium—
content of foliage of forest trees, relation to oxalate content. Robert F. Chandler, Jr 393-396
oxide, toxicity to fungi, tests 441-450
CALDWELL, RALPH M.: Rhynchosporium Scald of Barley, Rye, and Other Grasses 175-198
Calliphora sp., susceptibility to nicotine, experiments 911-913
Cataloups, in rotation, effect on lateral root system of sugar beets, tests 81
Carbon—
dioxide, effects upon lemons in storage, experiments 796-798, 802-804, 806, 808-809
metabolism of *Fusarium lycopersici* on glucose. Gordon H. Pritham and Arthur K. Anderson 937-949
Carotene, loss in hays and alfalfa meal during storage. Edward A. Kane, Herbert G. Wiseman, and C. A. Cary 837-847
CARY, C. A., KANE, EDWARD A., and WISEMAN, HERBERT G.: The Loss of Carotene in Hays and Alfalfa Meal During Storage 837-847
Casein, biological value as supplement to proteins of barley in rations for pigs. E. H. Hughes 461-465
Cattle, immunizing against infectious abortion, experiments with *Brucella abortus* strain 19 120-127
Cauliflower—
mosaic disease—
distribution and economic importance 34-35
symptoms 35-36
transmissible. C. M. Tompkins 33-46
transmission 37
mosaic virus—
comparison with turnip mosaic virus 43-44
host range, natural and experimental 38-42
properties and description 42-43
varieties, susceptibility to artificial infection with mosaic virus 38
Cereals—
absorption of selenium 67-68
food plants of wheat-stem maggot in Kansas 227-228
rhynchosporium scald, description and causal organism 175-198
Chalcids, parasites of *Meromyza americana* 225-226
Chalcophora virginiensis, presence in felled logs of Norway pine 130, 136, 139, 140
Chamaedaphne calyculata endophytes—
isolation and cultural characteristics 818-819
synthesis experiments 829-830
CHANDLER, ROBERT F., JR.: Certain Relationships Between the Calcium and Oxalate Content of Foliage of Certain Forest Trees 393-396
CHAPMAN, H. D., VANSELOW, A. P., and LIEBIG, GEORGE F., JR.: The Production of Citrus Mottle-Leaf in Controlled Nutrient Cultures 365-379
Chenopodium murale, passage of curly top virus through, for tests of virulence 455-456, 460

Page

Cherries—
Montmorency, ripening, factors affecting. 523-532
sour—
ripening season, factors influencing. V. R. Gardner 521-532
shading, influence on ripening season 526-527
size of crop, influence on ripening season 525-528
strain, influence on earliness and evenness of ripening 530-531
Cherry leaf spot, control by spraying, experiments 429
CHILDS, LEROY, and KIENHOLZ, J. R.: Twig Lesions as a Source of Early Spring Infection by the Pear Scab Organism 667-681
CHILDS, T. W., MIELKE, J. L., and LACHMUND, H. G.: Susceptibility to *Cronartium ribicola* of the Four Principal *Ribes* Species Found Within the Commercial Range of *Pinus monticola* 317-346
China-aster—
foot rot caused by *Phytophthora cryptogea*. C. M. Tompkins and C. M. Tucker 563-574
varieties, susceptibility to *Phytophthora cryptogea* infection 570
Chlorosis in irrigated wheat, factors affecting. D. W. Robertson and Robert Gardner 511-520
Chokecherry, black knot, ascigerous stage, suppression by spraying, experiments 429-430
CHRISTENSEN, CLYDE, LEACH, J. G., and ORR, L. W.: Further Studies on the Interrelationship of Insects and Fungi in the Deterioration of Felled Norway Pine Logs 129-140
CHRISTIE, J. R.: *Mermis subnigrescens*, a Nematode Parasite of Grasshoppers 353-364
Chrysanthemum foliage, sprayed, oil deposit on, determination, experiments 693-700
Chrysobothris dentipes, presence in felled logs of Norway pine 130, 136, 139, 140
Citrus mottle-leaf, production in controlled nutrient cultures. H. D. Chapman, A. P. Vanselow, and George F. Liebig, Jr. 365-379
Cladosporium carpophilum—
cause of peach scab 426
reaction to copper-lime-arsenic mixtures, studies 426-427, 440-450
CLAYTON, E. E.: Water Soaking of Leaves in Relation to Development of the Blackfire Disease of Tobacco 883-889
Clover, white, plants, cyanogenetic power, observations on variations in. Charles F. Rogers and O. C. Frykolm 533-537
Coccomyces hiemalis, cause of cherry leaf spot 429
Cockroach, cardiac response to nicotine, investigations 1-16
Codling moth larvae, susceptibility to nicotine, experiments 911-913
Colorado, selenium content of plants, relation to occurrence in soils 64-66
Columbia River, central breeding area, beet leafhopper in. Orin A. Hills 21-31
COOPER, D. C.: Macrosporogenesis and Embryo-Sac Development in *Euchlaena mexicana* and *Zea mays* 539-551
Copper—
in wire grasses from "salt sick" and healthy areas, quantitative determination, and estimation of other trace elements by spectrographic methods. L. L. Rusoff, L. H. Rogers, and L. W. Gaddum 731-738
sulphates, toxicity to fungi, tests 407-410, 441-450
Copper-lime-arsenic—
mixtures—
spraying for suppression of perithecia of *Venturia inaequalis*, results of experiments 407-414
toxicity studies 411-423, 435, 439-451
toxicity to certain phytopathogenic fungi grown on malt agar plates. D. H. Palmiter and G. W. Keitt 439-451
use in treatment of wheat seed for control of bunt, experiments 431-432
Corn—
borer, European—
abundance sampling, statistical study 849-870
fall population, sampling in field surveys, statistical study. M. T. Meyers and L. H. Patch 849-871

Page

Corn—Continued.
grinding, effect on amount of mastication and rumination of steers 588-597
in rotation, effect on lateral root system of sugar beets, tests 81, 84-85, 86
See also *Zea mays*.
Corticium koleroga, cause of thread blight of figs 430
Cowpeas in rotation, effect on lateral root system of sugar beets, tests 81, 84-85, 86
Cows—
Aberdeen Angus—
anatomy, comparison with Herefords and Holsteins, post-mortem data 258-268, 283-286
measurements, comparison with Herefords and Holsteins, ante-mortem data 248-258, 282-286
udder characteristics and performance record, studies 281-282
anatomy, comparison of beef and dairy breeds 239-286
beef, breeds, comparative conformation, anatomy, and udder characteristics. W. W. Swett, Fred W. Miller, R. R. Graves, W. H. Black, and G. T. Creech 239-287
breed—
comparisons of conformation and anatomy 247-248
differences in units of weight and measurement and in ratios 253-258, 265-266, 282-286
conformation, comparison of beef and dairy breeds 239-286
dairy—
breeds, comparative conformation, anatomy, and udder characteristics. W. W. Swett, Fred W. Miller, R. R. Graves, W. H. Black, and G. T. Creech 239-287
feeding alfalfa hay injured by sulphur dioxide, experiments. O. C. Cunningham, L. H. Addington, and Lewis T. Elliot 381-391
Hereford—
anatomy, comparison with Holsteins and Aberdeen Angus, post-mortem data 258-268, 283-286
body weights and feed consumption, comparison of dairy and beef herds 242-245
measurements, comparison with Holsteins and Aberdeen Angus, ante-mortem data 248-258, 282-286
milk-production records, comparison with dairy breeds 245-247
udder characteristics and performance of each experimental animal, data 273-279
Holstein—
anatomy, comparison with Herefords and Aberdeen Angus, post-mortem data 258-268, 283-286
measurements, comparison with Herefords and Aberdeen Angus, ante-mortem data 248-258, 282-286
udder characteristics and performance of each experimental animal, data 279-281
pregnant, vaccination with *Brucella abortus* strain 19 121
udder characteristics—
ante-mortem examination 268-270, 282-286
comparison of beef and dairy breeds 239-286
post-mortem studies 270-273, 282-286
weight, effect of feeding alfalfa hay fumigated with sulphur dioxide 387-388
Cranberry—
cultivated, production of synthetic mycorhiza. Henry F. Bain 811-835
endophytes, isolation and cultural characteristics 817-819
mycorhizal fungus, synthesis experiments 819-829
seedlings, inoculation with endophytes of *Chamaedaphne*, *Ledum*, and *Vaccinium canadense* 829-830
CREECH, G. T., SWETT, W. W., MILLER, FRED W., GRAVES, R. R., and BLACK, W. H.: Comparative Conformation, Anatomy, and Udder Characteristics of Cows of Certain Beef and Dairy Breeds 239-287

Page

Cronartium occidentale, telia, differentiation by microchemical colorimetric pH procedure. Ruby J. Acree and Warren H. Goss ... 347–352
Cronartium ribicola—
on *Pinus monticola*, ability of *Ribes lacustre* to intensify, example. J. L. Mielke ... 873–882
susceptibility of four principal *Ribes* species found within commercial range of *Pinus monticola*. J. L. Mielke, T. W. Childs, and H. G. Lachmund ... 317–346
telia—
and teliospore development on *Ribes* spp ... 336–339
differentiation by microchemical colorimetric pH procedure. Ruby J. Acree and Warren H. Goss ... 347–352
See also Blister rust, white-pine.
Crucifers, susceptibility to cauliflower mosaic disease ... 38–42
CUNNINGHAM, O. C., ADDINGTON, L. H., and ELLIOT, LEWIS T.: Nutritive Value for Dairy Cows of Alfalfa Hay Injured by Sulphur Dioxide ... 381–391
Curly top virus—
attenuated, restoration of virulence by passage through susceptible plants. C. F. Lackey ... 453–460
virulence tests with *Chenopodium murale*, alfilaria, and peppergrass ... 453–460
Currants—
found within range of *Pinus monticola*, susceptibility to *Cronartium ribicola*, investigations ... 317–345
See also *Ribes*.
Cyanogenetic power of white clover plants, observations on variations. Charles F. Rogers and O. C. Frykolm ... 533–537

Dactylis glomerata, host of *Rhynchosporium orthosporum* sp. nov., investigations ... 177–178, 180, 184, 189, 192, 194, 197
Dairy cows. *See* Cows, dairy.
Daisy, Transvaal, foot rot caused by *Phytophthora cryptogea*. C. M. Tompkins and C. M. Tucker ... 563–574
DAWSEY, L. H., and HILEY, J.: Improvements in Determination of Oil Deposit on Sprayed Foliage ... 693–701
Derris constituents, in bean plants, translocation. Robert A. Fulton and Horatio C. Mason ... 903–907
Dibotryon morbosum, cause of black knot of chokecherry ... 429
Dictyosteliaceae—
cultures, bacteria isolated from, association with *Dictyostelium discoideum* ... 301–304
growth and development with different bacterial associates ... 289–314
Dictyostelium discoideum—
association with—
bacteria isolated from cultures of Dictyosteliaceae ... 301–304
common saprophytic bacteria, study ... 293, 296–301, 312
various bacteria, growth comparisons ... 293–296
Vibrio alkaligines, cultural studies ... 291–292
growth and development with different bacterial associates. Kenneth B. Raper ... 289–316
host range ... 291–304, 310–314
myxamoebae, feeding habits ... 304–308, 312
nutrition, studies ... 304–308, 312
relation to associated bacteria ... 308–313
Dietary essentials, sheep, relation to fertility. George H. Hart and Robert F. Miller ... 47–58
Diets, low-nitrogen, feeding to lambs, effects ... 467–473
DOUGLAS, J. R., STEWART, M. A., and MILLER, R. F.: Resistance of Sheep of Different Breeds to Infestation by *Ostertagia circumcincta* ... 923–930
Dwarf disease, effect on alfalfa plant. J. L. Weimer ... 87–104

Egg production factors, interrelationships as determined for White Leghorn pullets. I. Michael Lerner and Lewis W. Taylor ... 703–712
ELLIOT, LEWIS T., CUNNINGHAM, O. C., and ADDINGTON, L. H.: Nutritive Value for Dairy Cows of Alfalfa Hay Injured by Sulphur Dioxide ... 381–391

Page

Elsinoë veneta, reaction to copper-lime-arsenic mixtures, toxicity studies ... 440–451
Elymus canadensis, host of *Rhynchosporium secalis*, investigations ... 177, 189–190, 192, 193, 194, 197
EMERY, W. T., and HILL, C. C.: The Biology of *Platygaster herrickii*, a Parasite of the Hessian Fly ... 199–213
Endophytes, of four Ericaceae, isolation and cultural characteristics ... 817–819
Energy value of milk of cows fed fumigated and unfumigated alfalfa, experiments ... 389–390
Epilachna varivestis, larvae, feeding bean leaves treated with derris, experiments ... 903–905, 907
Ericaceae—
four, endophytes of, isolation and cultural characteristics ... 817–819
See also Heath plants.
Erodium cicutarium, passage of attenuated curly top virus through for tests of virulence ... 456–457, 460
Euchlaena mexicana—
embryo—
fertilization and development ... 545–546, 549–550
sac, development ... 543–545, 549–550
macrosporogenesis ... 543, 549–550
macrosporogenesis and embryo-sac development. D. C. Cooper ... 539–551
ovule development ... 540–541, 549–550
Eutettix tenellus—
vector in spread of curly top virus ... 453
See also Sugar beet leafhopper.
Ewes—
fertility, relation to dietary essentials ... 47–58
gestation, value of vitamin A ... 54

Feeding stuffs, nitrogen-free extract of—
composition ... 583
uronic acid content. G. A. Guanzon and W. M. Sandstrom ... 581–586
Feeds—
digestibility and nitrogen-free extract as related to uronic acid content ... 585
mechanical processing, effect on mastication and rumination of steers. C. H. Kick, Paul Gerlaugh, A. F. Schalk, and E. A. Silver ... 587–597
nitrogen-free extract of, pentosans in ... 582–583
uronic acid content, analysis ... 582
Feedstuffs, nitrogen-free extract of, uronic acid content ... 581–585
Fertilizer treatments for wheat, effect on development of chlorosis ... 519
Fertilizers—
effect on—
nitrogen content of irrigated soil and wheat, experiments ... 514–519
yield of wheat treated at germination ... 514–519
nitrogenous, influence on ripening season of sour cherries ... 529–530
Fig, thread blight, suppression by spraying, experiments ... 430–431
Flax—
rust, reaction to, genes conditioning, nature and interaction. W. M. Myers ... 631–666
varieties, resistance to rust, genes conditioning, nature and interaction ... 631–666
Foliage—
forest trees, calcium and oxalate content, relationships between. Robert F. Chandler, Jr ... 393–396
sprayed, oil deposit on, improvements in determination. L. H. Dawsey and J. Hiley ... 693–701
FOLSOM, DONALD, and BONDE, REINER: Some Properties of Potato Rugose Mosaic and Its Components ... 765–783
Foot rot of China-aster, annual stock, and Transvaal daisy caused by *Phytophthora cryptogea*. C. M. Tompkins and C. M. Tucker ... 563–574
Forest trees—
calcium and oxalate content of leaves, relationships ... 393–396
certain, foliage of, calcium and oxalate content, relationships between. Robert F. Chandler, Jr ... 393–396

Page

Formula for reducing computations necessary to find the variance of a set of averages. William Dowell Baten ... 575–580
FRYKOLM, O. C., and ROGERS, CHARLES F.: Observations on the Variations in Cyanogenetic Power of White Clover Plants ... 533–537
FULTON, ROBERT A., and MASON, HORATIO C.: The Translocation of Derris Constituents in Bean Plants ... 903–907
Fungi—
interrelationship with insects in deterioration of felled Norway pine logs, further studies. J. G. Leach, L. W. Orr, and Clyde Christensen ... 129–140
phytopathogenic, grown on malt agar plates, toxicity of copper-lime-arsenic mixtures to. D. H. Palmiter and G. W. Keitt ... 439–451
Fungicides—
eradicant, potentialities for combating apple scab and some other plant diseases. G. W. Keitt and D. H. Palmiter ... 397–437
materials for, comparative studies ... 402–413
Fusarium lycopersici—
carbon metabolism on glucose. Gordon H. Pritham and Arthur K. Anderson ... 937–949
growth, reaction of medium in relation to, experiments ... 939–941
metabolism, ratio of products to one another and to glucose consumed ... 944–945
mycelium, composition ... 944, 947
organic acids, qualitative tests ... 943
utilization of ethyl alcohol ... 945–946
Fusarium resistance in Wisconsin All Seasons cabbage. L. M. Blank ... 497–510

GADDUM, L. W., RUSOFF, L. L., and ROGERS, L. H.: Quantitative Determination of Copper and Estimation of Other Trace Elements by Spectrographic Methods in Wire Grasses From "Salt Sick" and Healthy Areas ... 731–736
GAHAN, J. B., and YEAGER, J. FRANKLIN: Effects of the Alkaloid Nicotine on the Rhythmicity of Isolated Heart Preparations From *Periplaneta americana* and *Prodenia eridania* ... 1–19
GARDNER, ROBERT, and ROBERTSON, D. W.: Factors Affecting Chlorosis in Irrigated Wheat ... 511–520
GARDNER, V. R.: Factors Influencing the Ripening Season of Sour Cherries ... 521–532
Genes conditioning reaction to rust in flax, nature and interaction. W. M. Myers ... 631–666
GERLAUGH, PAUL, KICE, C. H., SCHALK, A. F., and SILVER, E. A.: The Effect of Mechanical Processing of Feeds on the Mastication and Rumination of Steers ... 587–597
Glomerella cingulata, reaction to copper-lime-arsenic mixtures, toxicity studies ... 440–451
Glucose, carbon metabolism of *Fusarium lycopersici* on. Gordon H. Pritham and Arthur K. Anderson ... 937–949
Goldfish, feeding bean leaves treated with derris, toxicity tests ... 905–906, 907
Goss, WARREN H., and ACREE, RUBY J.: A Microchemical Colorimetric pH Procedure for Differentiating the Telia of *Cronartium ribicola* and *C. occidentale* ... 347–352
Grasses—
rhynchosporium scald of. Ralph M. Caldwell ... 175–198
See also under specific kinds.
Grasshoppers—
nematode parasite, *Mermis subnigrescens*. J. R. Christie ... 353–364
species parasitized by *Mermis subnigrescens* ... 362
GRAVES, R. R., SWETT, W. W., MILLER, FRED W., BLACK, W. H., and CREECH, G. T.: Comparative Conformation, Anatomy, and Udder Characteristics of Cows of Certain Beef and Dairy Breeds ... 239–287
GUANZON, G. A., and SANDSTROM, W. M.: The Uronic Acid Content of the Nitrogen-Free Extract of Feeding Stuffs ... 581–586
Guinea pigs, inoculation with *Brucella abortus* strain 19, tests ... 119–120

Page

HARING, C. M., and TRAUM, J.: Observations of Pathogenic and Antigenic Effects of *Brucella abortus*, United States Bureau of Animal Industry Strain 19 ... 117–128
HART, GEORGE H., and MILLER, ROBERT F.: Relation of Certain Dietary Essentials to Fertility in Sheep ... 47–58
Hay—
alfalfa—
carotene loss during storage ... 840–842
injured by sulphur dioxide, nutritive value for dairy cows. O. C. Cunningham, L. H. Addington, and Lewis T. Elliot ... 381–391
mechanical processing, effect on amount of mastication and rumination of steers ... 588–597
clover, carotene loss during storage ... 843
green color, relation to carotene content, experiments ... 843
timothy, carotene loss during storage ... 842–843
Hays—
carotene loss during storage. Edward A. Kane, Herbert G. Wiseman, and C. A. Cary ... 837–847
storage experiments ... 839–843
Heart preparations, isolated, from *Periplaneta americana* and *Prodenia eridania*, effects of alkaloid nicotine on rhythmicity. J. Franklin Yeager and J. B. Gahan ... 1–19
Heartwood decay, relation to presence of *Monochamus* spp ... 130–138, 139–140
Heath plants—
four, endophytes of, isolation and cultural characteristics ... 817–819
infection with *Phoma radicis*, discussion ... 830–833
mycorhizal relations, discussion ... 830–833
Hessian fly—
parasite, *Platygaster herrickii*, biology. C. C. Hill and W. T. Emery ... 199–213
parasites, comparison ... 201–203
HILEY, J., and DAWSEY, L. H.: Improvements in Determination of Oil Deposit on Sprayed Foliage ... 693–701
HILL, C. C., and EMERY, W. T.: The Biology of *Platygaster herrickii*, a Parasite of the Hessian Fly ... 199–213
HILL, L. M., and ORTON, C. R.: An Undescribed Potato Disease in West Virginia ... 153–157
HILLS, ORIN A.: The Beet Leafhopper in the Central Columbia River Breeding Area ... 21–31
HOLTON, C. S., and RODENHISER, H. A.: Physiologic Races of *Tilletia tritici* and *T. levis* ... 483–496
Hordeum—
spp.—
hosts of *Rhynchosporium secalis*, investigations ... 177, 189–191, 194, 195, 197
resistance to smut ... 691
vulgare. *See* Barley.
HUGHES, E. H.: Biological Value of Casein as a Supplement to the Proteins of Barley in Rations for Pigs ... 461–465
Hydrogen-ion concentration in alfalfa, healthy and diseased plants, comparison ... 100–102
Hylobius congener, presence in felled logs of Norway pine ... 130, 136
Hymenoptera, parasites of *Meromyza americana* ... 225–226

Ichneumonids, parasites of *Meromyza americana* ... 225–226
Idaho, *Ribes* in, susceptibility of four species to white pine blister rust ... 317–345
Inheritance—
in cabbage, of resistance to yellows, study ... 497–510
in flax, of reaction to rust, nature and interaction of genes conditioning ... 631–666
in sorghum, of resistance to pythium root rot. D. H. Bowman, J. H. Martin, L. E. Melchers, and John H. Parker ... 105–115
in tomato, of fruit size and shape, studies. A. F. Yeager ... 141–152
Insect abundance, sampling in field surveys, statistical study ... 849–870

Page

Insects—
injection with nicotine, apparatus, material, and methods 909–912
interrelationship with fungi in deterioration of felled Norway pine logs, further studies. J. G. Leach, L. W. Orr, and Clyde Christensen 129–140
nicotine—
in, quantitative injection and effects. N. E. McIndoo 909–921
poisoning, symptoms 919
susceptibility to nicotine, tests 912–913
Irrigation—
water, temperature, effect on—
development of chlorosis in wheat, experiments 519
yield of wheat, experiments 511–514, 519
wheat, effect upon chlorosis 511–520

Jimsonweed, inoculation with potato rugose mosaic virus, methods 770, 771
JOHNSON, JAMES: Relation of Water-Soaked Tissues to Infection by *Bacterium angulatum* and *Bact. tabacum* and Other Organisms 599–618
JONES, LEON K., and VINCENT, C. L.: The Susceptibility of Potatoes to the Vein-Banding Virus 69–79

KANE, EDWARD A., WISEMAN, HERBERT G., and CAREY, C. A.: The Loss of Carotene in Hays and Alfalfa Meal During Storage 837–847
Kansas—
selenium content of plants, relation to occurrence in soils 61–64, 67
wheat-stem maggot, biology, observations. Merle W. Allen and Reginald H. Painter 215–238
KEITT, G. W., and PALMITER, D. H.—
Potentialities of Eradicant Fungicides for Combating Apple Scab and Some Other Plant Diseases 397–437
The Toxicity of Copper-Lime-Arsenic Mixtures to Certain Phytopathogenic Fungi Grown on Malt Agar Plates 439–451
KICK, C. H., GERLAUGH, PAUL, SCHALK, A. F., and SILVER, E. A.: The Effect of Mechanical Processing of Feeds on the Mastication and Rumination of Steers 587–597
KIENHOLZ, J. R., and CHILDS, LEROY: Twig Lesions as a Source of Early Spring Infection by the Pear Scab Organism 667–681

LACHMUND, H. G., MIELKE, J. L., and CHILDS, T. W.: Susceptibility to *Cronartium ribicola* of the Four Principal *Ribes* Species Found Within the Commercial Range of *Pinus monticola* 317–346
LACKEY, C. F.: Restoration of Virulence of Attenuated Curly Top Virus by Passage Through Susceptible Plants 453–460
LAMB, C. A., and SALTER, ROBERT M.: Response of Oat Varieties to Different Fertility Levels 785–793
Lambs—
breeds, resistance to *Ostertagia circumcincta*, experiments 923–930
ewe, fertility, relation of vitamin A to 52–54
feed consumed, effect of protein deficiency in ration on amount of. John I. Miller 467–474
rations deficient in protein, effect on amount of feed consumed. John I. Miller 467–474
LEACH, J. G., ORR, L. W., and CHRISTENSEN, CLYDE: Further Studies on the Interrelationship of Insects and Fungi in the Deterioration of Felled Norway Pine Logs. 129–140
Leafhoppers, spread of curly top virus to susceptible plants 453
Leaves, forest trees, calcium and oxalate content, relationship, investigations 393–396
Ledum groenlandicum, endophytes—
isolation and cultural characteristics 818–819
synthesis, experiments 829–830

Page

Lemons—
color, effect of storage conditions, experiments 807–808
decay, characteristics, effects of storage conditions 796–798
diseases, some effects of storage conditions on. Charles Brooks and Lacy P. McColloch 795–809
firmness, effect of storage conditions, experiments 807–809
membranous stain, characteristics, effects of storage conditions 805–807
packing in oiled wrappers, effect on condition in storage 804, 807
pitting, characteristics, effects of storage conditions 798–804
red blotch, description, occurrence, and control 804–805
scald, cause, description, and occurrence 807
storage conditions, some effects on certain diseases. Charles Brooks and Lacy P. McColloch 795–809
water break-down, characteristics and storage response 807
waxing, effects on condition in storage, experiments 798, 804, 806–807, 809
Lepidium nitidum, passage of attenuated curly top virus through for tests of virulence 453, 457–460
LERNER, I. MICHAEL, and TAYLOR, LEWIS W.: Interrelationships of Egg Production Factors as Determined for White Leghorn Pullets 703–712
LEVINE, M. N., and SMITH, D. C.: Comparative Reaction of Oat Varieties in the Seedling and Maturing Stages to Physiologic Races of *Puccinia graminis avenae*, and the Distribution of These Races in the United States 713–729
LIEBIG, GEORGE F., Jr., CHAPMAN, H. D., and VANSELOW, A. P.: The Production of Citrus Mottle-Leaf in Controlled Nutrient Cultures 365–379
Light, effect upon zinc requirement of citrus, experiments 370
Lime, toxicity to fungi 441–450
Linum usitatissimum. *See* Flax.
Logs, felled, of Norway pine, deterioration, interrelationship of insects and fungi in, further studies. J. G. Leach, L. W. Orr, and Clyde Christensen 129–140
Lucilia, susceptibility to nicotine, experiments 911–913

MANEY, T. J., and PLAGGE, H. H.: Factors Influencing the Development of Soggy Break-Down in Apples 739–763
MARTIN, J. H., BOWMAN, D. H., MELCHERS, L. E., and PARKER, JOHN H.: Inheritance of Resistance to Pythium Root Rot in Sorghum 105–115
MASON, HORATIO C., and FULTON, ROBERT A.: The Translocation of Derris Constituents in Bean Plants 903–907
Mastication of steers, effect of mechanical processing of feeds on. C. H. Kick, Paul Gerlaugh, A. F. Schalk, and E. A. Silver 587–597
MCCOLLOCH, LACY P., and BROOKS, CHARLES: Some Effects of Storage Conditions on Certain Diseases of Lemons 795–809
MCILVAINE, H. R. C., and POPP, H. W.: Growth Substances in Relation to the Mechanism of the Action of Radiation on Plants 931–936
MCINDOO, N. E.: Quantitative Injection and Effects of Nicotine in Insects 909–921
MCMURTREY, J. E., Jr.: Cross Transfer of Mineral Nutrients in the Tobacco Plant 475–482
Meal, alfalfa. *See* Alfalfa meals.
Medicago sativa. *See* Alfalfa.
Melampsora lini, cause of flax rust 631
MELCHERS, L. E., BOWMAN, D. H., MARTIN, J. H., and PARKER, JOHN H.: Inheritance of Resistance to Pythium Root Rot in Sorghum 105–115

Page

Melilotus—
nitrogen fixation in, effect of species of host plant on. P. W. Wilson, J. C. Burton, and V. S. Bond 619-629
spp., growth and nitrogen fixation by, in association with various strains of *Rhizobium meliloti*, experiments 620-628
Mermis subnigrescens—
distribution and economic significance 363
effect on grasshopper as host 362
egg, deposition, time of 359-360
eggs, dissemination 360-361
larvae, migration within host 361-362
life cycle 353-358
nematode parasite of grasshoppers. J. R. Christie 353-364
Meromyza americana—
damage, relation to maturity of wheat plant 228-235
differential infestation of wheat varieties 228-236
life history 219-224
parasites 225-226
See also Wheat-stem maggot.
Metabolism, carbon, of *Fusarium lycopersici* on glucose. Gordon H. Pritham and Arthur K. Anderson 937-949
MEYERS, M. T., and PATCH, L. H.: A Statistical Study of Sampling in Field Surveys of the Fall Population of the European Corn Borer 849-871
MIELKE, J. L.—
An Example of the Ability of *Ribes lacustre* to Intensify *Cronartium ribicola* on *Pinus monticola* 873-882
CHILDS, T. W., and LACHMUND, H. G.: Susceptibility to *Cronartium ribicola* of the Four Principal *Ribes* Species Found Within the Commercial Range of *Pinus monticola* 317-345
Milk production, cows fed alfalfa hay fumigated with sulphur dioxide, effects 387
MILLER, FRED W., SWETT, W. W., GRAVES, R. R., BLACK, W. H., and CREECH, G. T.: Comparative Conformation, Anatomy, and Udder Characteristics of Cows of Certain Beef and Dairy Breeds 239-287
MILLER, JOHN I.: Effect of Protein Deficiency in the Ration on the Amount of Feed Consumed by Lambs 467-474
MILLER, JOHN T., and BYERS, HORACE G.: Selenium in Plants in Relation to Its Occurrence in Soils 59-68
MILLER, R. F., STEWART, M. A., and DOUGLAS, J. R.: Resistance of Sheep of Different Breeds to Infestation by *Ostertagia circumcincta* 923-930
MILLER, ROBERT F., and HART, GEORGE H.: Relation of Certain Dietary Essentials to Fertility in Sheep 47-58
Milo, resistance to pythium root rot, inheritance studies 105-115
Mineral content of wire grasses from salt sick and healthy areas, estimation by spectrographic methods 731-737
Mineral nutrients in tobacco plant, cross transfer. J. E. McMurtrey, Jr. 475-482
Molybdenum, role in utilization of ammonium and nitrate nitrogen by *Aspergillus niger*. Robert A. Steinberg 891-902
Monochamus spp., in felled logs of Norway pine, relation to decay of heartwood 130-138, 139-140
Mosaic, rugose, of potatoes. *See* Potato rugose mosaic.
Mottle-leaf, citrus, production in controlled nutrient cultures. H. D. Chapman, A. P. Vanselow, and George F. Liebig, Jr. 365-379
Mycorhiza, synthetic, production in cultivated cranberry. Henry F. Bain 811-835
Mycosphaerella rubina, cause of spur blight of raspberry 428
MYERS, W. M.: The Nature and Interaction of Genes Conditioning Reaction to Rust in Flax 631-666

Nematode parasite, *Mermis subnigrescens*, of grasshoppers. J. R. Christie 353-364
New Mexico, selenium content of plants, relation to occurrence in soils 64-66

Page

Nicotine—
alkaloid, effects on rhythmicity of isolated heart preparations from *Periplaneta americana* and *Prodenia eridania*. J. Franklin Yeager and J. B. Gahan 1-19
injection into insects, apparatus, material, and methods 909-912
insecticidal use, quantitative injections 909-920
paralytic effect upon flies, study 917-918
poisoning, of insects, symptoms 919
quantitative injection and effects in insects. N. E. McIndoo 909-921
sulphate, toxicity to insects, comparison with nicotine 915-916
toxicity to—
insects, comparison with nicotine sulphate 915-916
Phormia adults, effect of point of injection 919-920
Nitrogen—
compounds, nutrient value for *Aspergillus niger* 892-898, 901
content of irrigated—
soil, relation to chlorosis in wheat 516-518
wheat, effect of fertilizers on 518-519
fixation in *Melilotus*, effect of species of host plant on. P. W. Wilson, J. C. Burton, and V. S. Bond 619-629
free extract of feeding stuffs, uronic acid content. G. A. Guanzon and W. M. Sandstrom 581-586
influence on ripening season of sour cherries, experiments 529-530
nitrate, utilization by *Aspergillus niger*, role of molybdenum. Robert A. Steinberg 891-902
Norway pine. *See* Pine, Norway.

Oat—
stem rust fungus—
infection, comparative reaction of oat varieties 716-727
physiologic races, prevalence and distribution 724-726
See also *Puccinia graminis avenae*.
varieties—
reaction to stem rust fungus, studies 716-727
response to different fertility levels. C. A. Lamb and Robert M. Salter 785-793
seedling and adult plant reaction to stem rust fungus 718-724
seedling and maturing stages, comparative reaction to physiologic races of *Puccinia graminis avenae*, and distribution of these races in United States. M. N. Levine and D. C. Smith 713-729
yields—
per acre, relation to fertility levels 786-789
variance, by seasons, relation to fertility levels, analysis 789-793
Oats—
fertility levels, plot-treatments in 3-year rotation tests 785-793
host of *Rhynchosporium secalis*, investigations 191, 194
Ohio, Wood County, corn-borer infestation, statistical study 853-854, 860-864, 868-869
Oil—
deposit on sprayed foliage, determination, improvements. L. H. Dawsey and J. Hiley 693-701
recovery from sprayed foliage, experiments 695-699
solvents, extraction efficiency on natural leaf substances 694-695
Oranges, susceptibility to mottle-leaf, cultural studies 365-378
Oregon, Hood River Valley, pear-scab infection studies 667-680
OER, L. W., LEACH, J. G., and CHRISTENSEN, CLYDE: Further Studies on the Interrelationship of Insects and Fungi in the Deterioration of Felled Norway Pine Logs 129-140
ORTON, C. R., and HILL, L. M.: An Undescribed Potato Disease in West Virginia 153-157
Ostertagia circumcincta, infestation of sheep, resistance of different breeds to. M. A. Stewart, R. F. Miller, and J. R. Douglas 923-930
Oxalate content of foliage of forest trees, relation to calcium content. Robert F. Chandler, Jr. 393-396

Page

PAINTER, REGINALD H., and ALLEN, MERLE W.: Observations on the Biology of the Wheat-Stem Maggot in Kansas ... 215–238

PALMITER, D. H., and KEITT, G. W.—
Potentialities of Eradicant Fungicides for Combating Apple Scab and Some Other Plant Diseases ... 397–437
The Toxicity of Copper-Lime-Arsenic Mixtures to Certain Phytopathogenic Fungi Grown on Malt Agar Plates ... 439–451

PARKER, JOHN H., BOWMAN, D. H., MARTIN, J. H., and MELCHERS, L. E.: Inheritance of Resistance to Pythium Root Rot in Sorghum ... 105–115

PATCH, L. H., and MEYERS, M. T.: A Statistical Study of Sampling in Field Surveys of the Fall Population of the European Corn Borer ... 849–871

Peach scab, suppression by spraying, experiments ... 426–428

Pear—
scab—
control by spraying, experiments ... 428–429
control experiments ... 676–679, 680
cycle of infection ... 668–670
organism, early spring infection, twig lesions as source. J. R. Kienholz and Leroy Childs ... 667–681
trees, twig lesions, source of early spring infection by scab organism ... 667–680

Pears, varietal susceptibility to twig scab ... 668

Peniophora gigantea, cause of heartwood decay in Norway pine ... 137–138, 139, 140

Peppergrass, passage of attenuated curly top virus through for tests of virulence ... 453, 457–460

Periplaneta americana, heart preparations isolated from, effects of alkaloid nicotine on rhythmicity. J. Franklin Yeager and J. B. Gahan ... 1–19

Peteca of lemons, characteristics, effects of storage conditions ... 798–804

Phoma radicis, growth in heath plants, discussion ... 830–833

Phormia—
adults—
inoculation with nicotine, motor paralysis studies ... 917–918
susceptibility to nicotine, effect of age ... 913–915
toxicity of nicotine to, effect of point of injection ... 919–920
injection with nicotine, studies ... 911–920

Phosphorus, relation to fertility in ewes ... 54–58

Phyllosticta solitaria—
cause of apple blotch ... 424
reaction to copper-lime-arsenic mixtures, toxicity studies ... 424–426, 440–450

Physalospora obtusa, reaction to copper-lime-arsenic mixtures, toxicity studies ... 440–450

Phytophthora cryptogea—
cause of foot rot of China-aster, annual stock, and Transvaal daisy. C. M. Tompkins and C. M. Tucker ... 563–574
experimental host range ... 570–572
isolation and technical description ... 567–568
pathogenicity on China-aster, annual stock, and Transvaal daisy, tests ... 568–570

Phytophthora foot rot of—
annual stock, symptoms ... 565
China-aster, symptoms ... 564–565
Transvaal daisy, symptoms ... 566–567

Pigs—
feeding, experiments ... 461–465
rations, biological value of casein as supplement to proteins of barley. E. H. Hughes ... 461–465

Pine—
Norway—
felled logs, deterioration, interrelationship of insects and fungi in, further studies. J. G. Leach, L. W. Orr, and Clyde Christensen ... 129–140
heartwood, decay, relation to presence of *Monochamus* spp ... 130–138, 139–140
western white—
blister rust infection, intensification by *Ribes lacustre* ... 878–880
range limits in relation to spread of white pine blister rust ... 318–320

Page

Pine—Continued.
white, blister rust. *See* Blister rust, white pine.

Pinus—
monticola—
commercial range, four principal *Ribes* species found within, susceptibility to *Cronartium ribicola*. J. L. Mielke, T. W. Childs, and H. G. Lachmund ... 317–346
Cronartium ribicola on, ability of *Ribes lacustre* to intensify, example. J. L. Mielke ... 873–882
resinosa. *See* Pine, Norway.

Pitting of lemons, characteristics, effects of storage conditions ... 798–804

PLAGGE, H. H., and MANEY, T. J.: Factors Influencing the Development of Soggy Break-Down in Apples ... 739–763

Plant—
diseases, combating with eradicant fungicides, potentialities. G. W. Keitt and D. H. Palmiter ... 397–437
tissues, water-soaked, relation to infection by *Bacterium angulatum* and *Bact. tabacum* and other organisms. James Johnson ... 599–618

Plants—
correlation between number of pedicels, formula for reducing computations ... 579–580
radiation on, mechanism of action, relation to growth substances. H. W. Popp and H. R. C. McIlvaine ... 931–936
selenium—
absorption and tolerance ... 67–68
content, relation to occurrence in soils. John T. Miller and Horace G. Byers ... 59–68
susceptible to curly top, restoration of virulence of attenuated virus by passage through. C. F. Lackey ... 453–460

Platygaster herrickii—
adults, morphology, oviposition, and habits ... 201–203
distribution and economic importance ... 199–200
egg and embryonic development, description ... 203–207
larvae, cocoon, and pupa, morphology ... 207–209
parasite of hessian fly, biology. C. C. Hill and W. T. Emery ... 199–213
seasonal history and mortality ... 210–212

Plots, three-row, yield averages, formula for computing, data ... 575–578

Plum brown rot, control by spraying, experiments ... 424

POPP, H. W., and MCILVAINE, H. R. C.: Growth Substances in Relation to the Mechanism of the Action of Radiation on Plants ... 931–936

Potassium hydroxide solution, nicotine sulphate in, toxicity to insects ... 916

Potato—
disease—
diagnosis ... 153–156
undescribed, in West Virginia. C. R. Orton and L. M. Hill ... 153–157
Early Rose, tuber of, virus-free, field tests with progeny ... 71–72
inoculation with rugose mosaic virus, methods ... 770, 771
rugose mosaic—
comparison with other mosaics ... 778–781
extract, dilution and filtration, effect upon infectivity ... 775–776
properties, and its components. Donald Folsom and Reiner Bonde ... 765–783
symptoms ... 766–769
virulence, attenuation and increase in, studies ... 781
virus, infectivity, experiments ... 771–778
virus, reaction to chemicals ... 777–778
virus, thermal death point ... 774–775
seedling clones, virus-free, tests with progeny ... 70–79
varieties, commercial, susceptibility to vein-banding virus ... 77–78

Potatoes, susceptibility to vein-banding virus. Leon K. Jones and C. L. Vincent ... 69–79

PRITHAM, GORDON H., and ANDERSON, ARTHUR K.: The Carbon Metabolism of *Fusarium lycopersici* on Glucose ... 937–949

Page

Prodenia eridania, heart preparations isolated from, effects of alkaloid nicotine on rhythmicity. J. Franklin Yeager and J. B. Gahan ... 1-19
Protein—
deficiency in ration of lambs, effect on amount of feed consumed. John I. Miller ... 467-474
relation to fertility in ewes ... 50-52, 54-57
Proteins of barley in rations for pigs, biological value of casein as a supplement to. E. H. Hughes ... 461-465
Puccinia graminis avenae—
physiologic races—
comparative reaction of oat varieties in seedling and maturing stages to, and distribution in United States. M. N. Levine and D. C. Smith ... 713-729
identification, analytical key ... 717
See also Oat stem rust fungus.
Pullets, White Leghorn, egg production factors, interrelationships. I. Michael Lerner and Lewis W. Taylor ... 703-712
Pyrausta nubilalis. *See* Corn borer.
Pyrus communis. *See* Pear.
Pythium—
arrhenomanes—
cause of root rot of sorghum ... 105, 115
resistance in sorghum, inheritance ... 105-115
root rot in sorghum, inheritance of resistance to. D. H. Bowman, J. H. Martin, L. E. Melchers, and John H. Parker ... 105-115

Radiation, action on plants, growth substances in relation to mechanism. H. W. Popp and H. R. C. McIlvaine ... 931-936
RAPER, KENNETH B.: Growth and Development of *Dictyostelium discoideum* With Different Bacterial Associates ... 289-316
Raspberry spur blight, control by spraying, experiments ... 428
Rations—
deficient in protein, effect on amount of feed consumed by lambs. John I. Miller ... 467-474
for pigs, biological value of casein as supplement to proteins of barley in. E. H. Hughes ... 461-465
for sheep, effect upon fertility ... 47-58
See also Feeds.
Rhagium lineatum, presence in felled logs of Norway pine ... 130, 136
Rhizobium meliloti, strains in association with *Melilotus* spp., inoculation experiments ... 620-628
Rhynchosporium—
emended description ... 183
excluded species ... 184-185
infection method, development in host tissue, and fructification ... 180-181
orthosporum sp. nov.—
isolation and culture ... 185-186
physiologic specialization ... 188-195
technical description ... 184
scald—
causal organism, studies ... 182-196
of barley, rye, and other grasses. Ralph M. Caldwell ... 175-198
pathological histology ... 178-180, 181-182
plants attacked and symptoms ... 176-180
synonyms, history, and importance ... 175-176
secalis—
isolation and culture ... 185-186
nomenclature ... 183-184
physiologic specialization and life history ... 188-196
spp., cause of scald of barley, rye, and other grasses ... 175, 196, 197
spp., temperature and humidity relations ... 186-188
taxonomy and nomenclature ... 182-183
Ribes—
inerme, susceptibility to *Cronartium ribicola*, experiments and results ... 320-344
lacustre—
ability to intensify *Cronartium ribicola* on *Pinus monticola*, an example. J. L. Mielke ... 873-882
blister rust infection on, development ... 876-877
susceptibility to *Cronartium ribicola*, experiments and results ... 320-345

Page

Ribes—Continued.
petiolare, susceptibility to *Cronartium ribicola*, experiments and results ... 320-324
spp.—
four principal, found within commercial range of *Pinus monticola*, susceptibility to *Cronartium ribicola*. J. L. Mielke, T. W. Childs, and H. G. Lachmund ... 317-346
inoculation with *Cronartium ribicola*, experiments ... 324-326
susceptibility to *Cronartium ribicola*, reaction of individual bushes ... 330-333
susceptibility to *Cronartium ribicola*, general reaction of four species ... 327-330
susceptibility to white pine blister rust, inherent differences within species ... 333-336
viscosissimum, susceptibility to *Cronartium ribicola*, experiments and results ... 320-324
ROBERTSON D. W., and GARDNER, ROBERT: Factors Affecting Chlorosis in Irrigated Wheat ... 511-520
RODENHISER, H. A., and HOLTON, C. S.: Physiologic Races of *Tilletia tritici* and *T. levis* ... 483-496
ROGERS, CHARLES F., and FRYKOLM, O. C.: Observations on the Variations in Cyanogenetic Power of White Clover Plants ... 533-537
ROGERS, L. H., RUSOFF, L. L., and GADDUM, L. W.: Quantitative Determination of Copper and Estimation of Other Trace Elements by Spectrographic Methods in Wire Grasses From "Salt Sick" and Healthy Areas ... 731-738
Root structure, lateral, in sugar beet, effect of environmental conditions on, observations. Ernst Artschwager ... 81-86
Rotation practices, effect on sugar beet lateral root system, experiments ... 81, 84-85, 86
Rotenone, isolation and identification in bean leaves, tests ... 906-907
Roughage in rations of steers, effect on amount of mastication and rumination ... 588-597
Rumination of steers, effect of mechanical processing of feeds on. C. H. Kick, Paul Gerlaugh, A. F. Schalk, and E. A. Silver ... 587-597
RUSOFF, L. L., ROGERS, L. H., and GADDUM, L. W.: Quantitative Determination of Copper and Estimation of Other Trace Elements by Spectrographic Methods in Wire Grasses From "Salt Sick" and Healthy Areas ... 731-738
Rust—
in flax, reaction to, genes conditioning, nature and interaction. W. M. Myers ... 631-666
See also under specific host.
Rye, rhynchosporium scald. Ralph M. Caldwell ... 175-198

"Salt sick" areas, wire grasses from, quantitative determination of copper and estimation of other trace elements by spectrographic methods. L. L. Rusoff, L. H. Rogers, and L. W. Gaddum ... 731-738
SALTER, ROBERT M., and LAMB, C. A.: Response of Oat Varieties to Different Fertility Levels ... 785-793
SANDSTROM, W. M., and GUANZON, G. A.: The Uronic Acid Content of the Nitrogen-Free Extract of Feeding Stuffs ... 581-586
SCHALK, A. F., KICK, C. H., GERLAUGH, PAUL, and SILVER, E. A.: The Effect of Mechanical Processing of Feeds on the Mastication and Rumination of Steers ... 587-597
Sclerotinia fructicola—
cause of brown rot of plum ... 424
reaction to copper-lime-arsenic mixtures, toxicity studies ... 424, 440-450
Selenium in plants, relation to occurrence in soils. John T. Miller and Horace G. Byers ... 59-68
Sesbania spp. in rotation, effect on lateral root system of sugar beets, tests ... 81, 84-85
Sheep—
dietary essentials, relation to fertility. George H. Hart and Robert F. Miller ... 47-58
different breeds, resistance to infestation by *Ostertagia circumcincta*. M. A. Stewart, R. F. Miller, and J. R. Douglas ... 923-930

Page

Sheep—Continued.
fertility, relation of certain dietary essentials. George H. Hart and Robert F. Miller ... 47–58
Silkworms, susceptibility to nicotine, experiments ... 911–913
SILVER, E. A., KICK, C. H., GERLAUGH, PAUL, and SCHALK, A. F.: The Effect of Mechanical Processing of Feeds on the Mastication and Rumination of Steers ... 587–597
Slime molds. *See* Dictyosteliaceae.
SMITH D. C., and LEVINE, M. N.: Comparative Reaction of Oat Varieties in the Seedling and Maturing Stages to Physiologic Races of *Puccinia graminis avenae*, and the Distribution of These Races in the United States ... 713–729
Soils, selenium content, relation to occurrence in plants. John T. Miller and Horace G. Byers ... 59–68
Solanum tuberosum. *See* Potato.
Solids, dissolved in sorgo stalk, distribution and variation with maturity. Emil K. Ventré and S. Byall ... 553–562
Sorghum—
crosses, coleoptile color and pythium resistance, studies ... 114–115
hybrids—
heterosis, relation to pythium resistance ... 115
susceptibility to pythium root rot ... 106–115
resistance to pythium root rot, inheritance. D. H. Bowman, J. H. Martin, L. E. Melchers, and John H. Parker ... 105–115
Sorgo—
Gooseneck, juice, yield and composition from various internodes at different stages of maturity ... 554–556, 560–562
Hodo, juice, yield and composition from various internodes at different stages of maturity ... 554, 559–562
Honey, juice, yield and composition from various internodes at different stages of maturity ... 554, 556–557, 560–562
Iceberg, juice, yield and composition from various internodes at different stages of maturity ... 554, 558, 560–562
stalk, dissolved solids and sucrose and titratable acidity in, distribution and variation with maturity. Emil K. Ventré and S. Byall ... 553–562
Spectrographic methods, use for quantitative determination of copper and estimation of other trace elements in wire grasses from "salt sick" and healthy areas. L. L. Ruzoff, L. H. Rogers, and L. W. Gaddum ... 731–738
Spore formations, differences in *Cronartium ribicola* and *C. occidentale*, detection procedures ... 347–352
Spray oil—
deposit on foliage, determination, improvements ... 693–700
recovery from foliage, experiments ... 695–699
solvents, extraction efficiency on natural leaf substances ... 694–695
Sprays—
fungicidal, use against apple scab and other plant diseases, experiments ... 397–435
toximetric studies ... 439–441
use against pear scab, experiments ... 676–679, 680
Stanleya spp., absorption of selenium ... 59, 61, 63, 64–65
Starch content of alfalfa, healthy and dwarfed plants, comparison ... 103
Steers—
feeding with roughages and concentrates, experiments ... 588–597
mastication and rumination, effect of mechanical processing of feeds on. C. H. Kick, Paul Gerlaugh, A. F. Schalk, and E. A. Silver ... 587–597
weight, averages, formula for reducing computations ... 578–579
STEINBERG, ROBERT A.: Role of Molybdenum in the Utilization of Ammonium and Nitrate Nitrogen by *Aspergillus niger* ... 891–902
STEWART, M. A., MILLER, R. F., and DOUGLAS, J. R.: Resistance of Sheep of Different Breeds to Infestation by *Ostertagia circumcincta* ... 923–930

Page

Stock, annual, foot rot caused by *Phytophthora cryptogea*. C. M. Tompkins and C. M. Tucker ... 563–574
Storage of—
hays and alfalfa meal, effect on carotene content ... 837–846
lemons, some effects of conditions on certain diseases. Charles Brooks and Lacy P. McColloch ... 795–809
Streak, comparison with potato rugose mosaic ... 779
Sucrose in sorgo stalk, distribution and variation with maturity. Emil K. Ventré and S. Byall ... 553–562
Sudan grass in rotation, effect on lateral root system of sugar beets, tests ... 81, 84–85
Sugar beet—
lateral root structure, effect of environmental conditions, observations. Ernst Artschwager ... 81–86
leafhopper—
egg development ... 29–30
fall and winter survival in Columbia River Valley ... 27–28
host plants in Columbia River Valley ... 23–24
life history ... 21–22
seasonal coloration in Columbia River Valley ... 28
seasonal occurrence and dispersals ... 24–27
root system, lateral, effect of environment, data ... 84–85
rootlets—
lateral, distribution, origin, and structure, description ... 82–84
pathological disturbances ... 85–86
Sugar beets, cotyledon stage, susceptibility to—
attenuated curly top virus from alfilleria, tests ... 453, 455, 456–457
attenuated curly top virus from *Chenopodium murale*, tests ... 455–456
attenuated curly top virus from peppergrass, tests ... 457–460
Sugar content of alfalfa, healthy and dwarfed plants, comparison ... 103
Sulphur dioxide, alfalfa hay injured by, nutritive value for dairy cows. O. C. Cunningham, L. H. Addington, and Lewis T. Elliot ... 381–391
Sweetclover—
nitrogen fixation in, experiments ... 620–628
See also *Melilotus*.
SWETT, W. W., MILLER, FRED W., GRAVES, R. R., BLACK, W. H., and CREECH, G. T.: Comparative Conformation, Anatomy, and Udder Characteristics of Cows of Certain Beef and Dairy Breeds ... 239–287

TAPKE, V. F.: Physiologic Races of *Ustilago hordei* ... 683–692
TAYLOR, LEWIS W., and LERNER, I. MICHAEL: Interrelationships of Egg Production Factors as Determined for White Leghorn Pullets ... 703–712
Temperature—
effect on—
lemons in storage, experiments ... 796, 798–802, 805–806, 807, 808
thermal death point of potato rugose mosaic virus ... 774–775
influence on ripening season of sour cherries ... 523–524
irrigation water, effect on—
development of chlorosis in wheat ... 519
yield of wheat, experiments ... 511–514
storage—
effect on carotene loss of hays ... 840–843
relation to soggy break-down of apples ... 740–746, 760
Tent caterpillar, eastern, susceptibility to nicotine, experiments ... 911–913
Teosinte. See *Euchlaena mexicana*.
Tilletia—
levis, physiologic races. H. A. Rodenhiser and C. S. Holton ... 483–496
tritici, physiologic races. H. A. Rodenhiser and C. S. Holton ... 483–496

Page

Timber, merchantable, board-foot volume tables, simplified method of constructing.. 159–173
Timothy hay, carotene loss during storage.. 842–843
Tobacco—
blackfire disease—
control measures 889
development, relation to water soaking of leaves. E. E. Clayton 883–889
growth, relation to mineral nutrients, experiments 475–481
infection with—
Bacterium angulatum and *Bact. tabacum*, relation to water soaking of tissues 599–618
potato rugose mosaic virus, symptoms.. 767–769
leaves—
symptoms of mineral deficiencies, studies 475–482
water-soaked, inoculation with *Bacterium angulatum* 883–886
water soaking, relation to development of blackfire disease. E. E. Clayton 883–889
mosaic, comparison with potato rugose mosaic 779
plant, mineral nutrients, cross transfer. J. E. McMurtrey, Jr 475–482
plants, inoculation with potato rugose mosaic virus, methods 770, 771
spot necrosis, comparison with potato rugose mosaic 779–781
tissue, water-soaked, infection with *Bacterium angulatum*, factors affecting 604–613, 616–618
topping and fertilization practices, effect on susceptibility to blackfire 887–888, 889
water-soaked, infection with *Bacterium tabacum*, factors affecting 613, 615, 617–618
Tomato—
crosses, fruit size and shape, inheritance studies 142–151
fruit size and shape, inheritance and development, studies. A. F. Yeager 141–152
inoculation with potato rugose mosaic virus, methods 771
size, shape, and locule number, correlations 142–147, 150–151
tissue, water-soaked—
infection with *Bacterium angulatum* 604, 610, 616–618
infection with *Bacterium tabacum* 613, 617–618
susceptibility to infection and parasitism 600, 603, 604, 610, 613–616, 617, 618
TOMPKINS, C. M.—
A Transmissible Mosaic Disease of Cauliflower 33–46
and TUCKER, C. M.: Foot Rot of China-Aster, Annual Stock, and Transvaal Daisy Caused by *Phytophthora cryptogea* 563–574
Transpiration, alfalfa, healthy and dwarfed plants, study 97–99
TRAUM, J., and HARING, C. M.: Observations of Pathogenic and Antigenic Effects of *Brucella abortus*, United States Bureau of Animal Industry Strain 19 117–128
Trees—
forest. *See* Forest trees.
fruit, spraying for control of apple scab and other diseases, experiments 400–435
measurement for volume tables, simplified method, data 169–172
species, volume differences, factors influencing 159–161
standing, merchantable contents in board feet, measurements, simplified method.. 159–173
volume—
basic curves of, plotting 161–169
tables, application in the field, new method 172–173
TUCKER, C. M., and TOMPKINS, C. M.: Foot Rot of China-Aster, Annual Stock, and Transvaal Daisy Caused by *Phytophthora cryptogea* 563–574
Turnips, radiation on, mechanism of action in relation to growth substances 933–936
Twig lesions, source of early spring infection by pear scab organism. J. R. Kienholz and Leroy Childs 667–681

Page

United States, oat varieties, seedling and maturing stages, comparative reaction to physiologic races of *Puccinia graminis avenae*, and the distribution of these races in. M. N. Levine and D. C. Smith 713–729
Uronic acid content of nitrogen-free extract of feeding stuffs. G. A. Guanzon and W. M. Sandstrom 581–586
Ustilago hordei, physiologic races—
V. F. Tapke 683–692
identification 686–688

Vaccination of cattle against *Brucella abortus* infection, experiments with strain 19 120–127
Vaccinium—
canadense, endophytes—
isolation and cultural characteristics 818–819
synthesis experiments 829–830
macrocarpon. *See* Cranberry.
VANSELOW, A. P., CHAPMAN, H. D., and LIEBIG, GEORGE F., Jr.: The Production of Citrus Mottle-Leaf in Controlled Nutrient Cultures 365–379
Vein-banding virus, susceptibility of potatoes to. Leon K. Jones and C. L. Vincent. 69–79
VENTRÉ, EMIL K., and BYALL, S.: Distribution and Variation With Maturity of Dissolved Solids, Sucrose, and Titratable Acidity in the Sorgo Stalk 553–562
Venturia—
inaequalis—
cause of apple scab 397
perithecia, development, effect of eradicant fungicides on 400–415
reaction to copper-lime-arsenic mixtures, toxicity studies 411–423, 433–434, 439–450
pyrina—
cause of pear scab 428
damage to pear twigs, and control 667–680
reaction to copper-lime-arsenic mixtures, toxicity studies 428–429, 440–450
seasonal development and spore load in relation to scab 670–676
Vibrio alkaligines, association with *Dictyostelium discoideum* 291–292, 293
VINCENT, C. L., and JONES, LEON K.: The Susceptibility of Potatoes to the Vein-Banding Virus 69–79
Vitamin A, relation to fertility—
in ewe lambs 52–53
in ewes 48–58
Volume tables, board-foot, merchantable, simplified method of constructing. R. H. Blythe, Jr 159–173

Washington, potatoes, susceptibility to vein-banding virus 69–79
Weather—
effect on infection of *Ribes* spp. by *Cronartium ribicola* 339–342
records for Hood River Valley, Oregon, 1934–35 670–672
WEIMER, J. L.: Effect of the Dwarf Disease on the Alfalfa Plant 87–104
West Virginia, potato disease, undescribed. C. R. Orton and L. M. Hill 153–157
Wheat—
chlorosis, development, effect of temperature of irrigation water and fertilizers 519
host of *Rhynchosporium secalis*, investigations 191, 194, 195
irrigated, chlorosis in, factors affecting. D. W. Robertson and Robert Gardner 511–520
plant maturity, relation to number of heads blasted by stem maggot 228–235
seed treatment for suppression of bunt, experiments 431, 432
spring, reaction to physiologic races of *Tilletia*, comparison 483–495
stem maggot—
biology, observations in Kansas. Merle W. Allen and Reginald H. Painter 215–238
feeding habits and food plants 227–228
hymenopterous parasites, list 225–226
See also *Meromyza americana*.

	Page
Wheat—Continued.	
varieties—	
infestation by *Meromyza americana*	228–236
reaction to various races of bunt under different environmental conditions	492–493
winter, reaction to physiologic races of *Tilletia*, comparison	483–495
yield, effect of—	
different fertilizer treatments at germination	514–519
temperature of irrigation water applied at germination	511–514
WILSON, P. W., BURTON, J. C., and BOND, V. S.: Effect of Species of Host Plant on Nitrogen Fixation in *Melilotus*	619–629
Wire grasses from "salt sick" and healthy areas, quantitative determination of copper and estimation of other trace elements in, by spectrographic methods. L. L. Rusoff, L. H. Rogers, and L. W. Gaddum.	731–738
WISEMAN, HERBERT G., KANE, EDWARD A., and CARY, C. A.: The Loss of Carotene in Hays and Alfalfa Meal During Storage	837–847
Xylorrhiza parryi, absorption of selenium	67
YEAGER, A. F.: Studies on the Inheritance and Development of Fruit Size and Shape in the Tomato	141–152
YEAGER, J. FRANKLIN, and GAHAN, J. B.: Effects of the Alkaloid Nicotine on the Rhythmicity of Isolated Heart Preparations From *Periplaneta americana* and *Prodenia eridania*	1–19
Zea mays—	
× *Euchlaena mexicana*, macrosporogenesis, description	548
macrosporogenesis and embryo-sac development. D. C. Cooper	539–551
ovule and embryo sac, development	546–548, 549–550
Zinc, use in control of citrus mottle-leaf, experiments and results	365–378

Page
67

1-152

1-19

548

9-551
-548,
9-550

-378